SOCIAL, PSYCHOLOGICAL, AND EDUCATIONAL CHARACTERISTICS OF ADOLESCENTS AND YOUNG ADULTS KILLED IN INDIANA AUTOMOBILE ACCIDENTS

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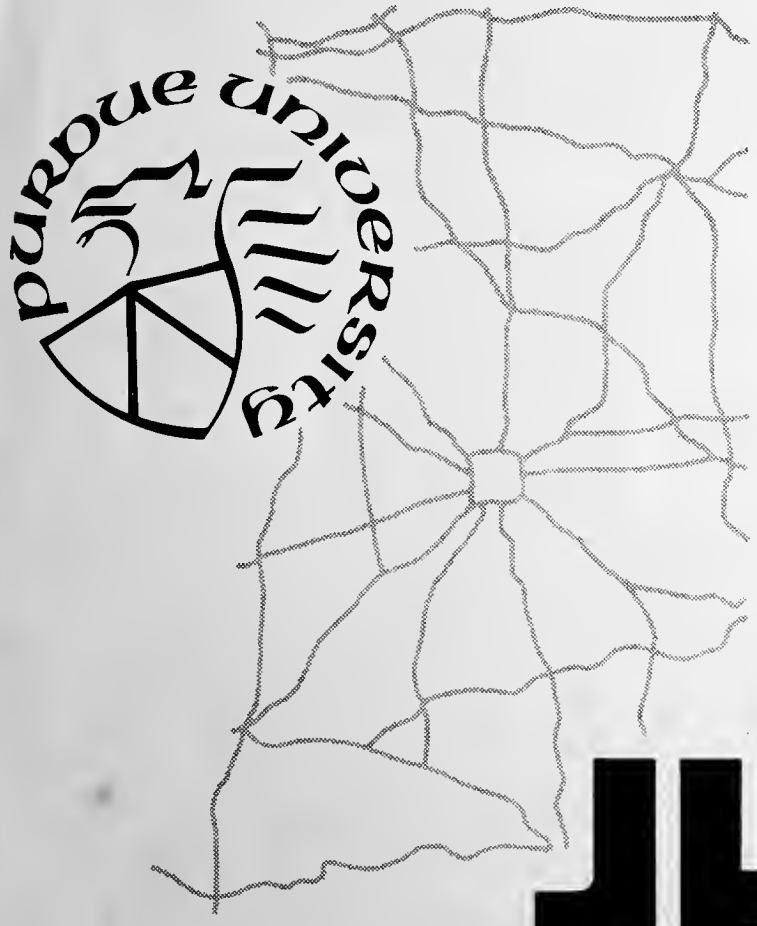

BY

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JOINT HIGHWAY RESEARCH PROJECT

PURDUE UNIVERSITY AND

INDIANA STATE HIGHWAY COMMISSION

Progress Report
SOCIAL, PSYCHOLOGICAL, AND EDUCATIONAL
CHARACTERISTICS OF ADOLESCENTS
AND YOUNG ADULTS KILLED
IN INDIANA AUTOMOBILE ACCIDENTS

TO: J. F. McLaughlin, Director
Joint Highway Research Project

October 28, 1970

File No. 8-5-11

FROM: H. L. Michael, Associate Director
Joint Highway Research Project

Project No. C-36-59K

The attached Progress Report "Social, Psychological, and Educational Characteristics of Adolescents and Young Adults Killed in Indiana Automobile Accidents" is submitted as the second report on the special research project approved by the JHRP Board on the relationship of driver education to highway safety. The research is being conducted by Professor William Asher, Departments of Education and Psychology, and Mrs. Beverly Dodson, Research Assistant.

Additional research is in progress on Indiana State Police accident records of young drivers and will be reported at a later date.

The Report is presented to the Board for information and for the record.

Respectfully submitted,

Harold L. Michael
Associate Director

HLM/hmp

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Progress Report

SOCIAL, PSYCHOLOGICAL, AND EDUCATIONAL CHARACTERISTICS OF ADOLESCENTS AND YOUNG ADULTS KILLED IN INDIANA AUTOMOBILE ACCIDENTS

by

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File No. 8-5-11
Project No. C-36-59K

Purdue University
Lafayette, Indiana
October 28, 1970

SOCIAL, PSYCHOLOGICAL, AND EDUCATIONAL CHARACTERISTICS OF ADOLESCENTS AND YOUNG ADULTS KILLED IN INDIANA AUTOMOBILE ACCIDENTS

ABSTRACT

From the literature it is apparent that the prime contributor of automobile accidents is human factors. Teenagers and young adults are greatly over represented in accident statistics with respect to their proportion of all drivers. This longitudinal study of automobile accident fatalities in this age group determined with some accuracy that those killed are lower in educational and socioeconomic levels than their cohorts. Also they may have distinct psychological differences. Driver education is of no predictive importance and, in fact, may be somewhat of a factor in increasing the death rate. They learned to drive at younger ages. Four hundred fifty-five social, psychological, and educational variables were tested and 95 showed differences between the fatality group and the norms.

Of perhaps greater importance is the collection of data from which a far better study of this type could and should be done.

ACKNOWLEDGMENT

The researchers wish to thank the Indiana State Police for their very helpful assistance (not just acquiescence) in collecting data for this project. Superintendent Robert K. Konkle gave formal permission to use their files and Sgt. James Kinder, Director of the Accident Records Bureau gave continuing help in facilities, interpretations, and tactics of data gathering.

This investigation utilized the Project TALENT Data Bank, a cooperative effort of the U. S. Office of Education and the American Institutes for Research. The design, interpretation, and analyses of the research reported herein, however, are solely the responsibility of the authors.

The Department of Education at Purdue furnished facilities, secretarial assistance, and the senior researcher's time.

INTRODUCTION

Automobile accidents are among the leading cause of death for young people in the late teens and first half of the twenties. This age group also has one-third of all accidents even though they constitute only 21% of the drivers (Hart, 1969). Thus these young drivers are an important population for research whenever human factors in automobile accidents are studied.

That human factors are now a prime cause of automobile accidents is well known. The other two major areas of causation, the highway driving environment and the automobile, have been the subject of a great deal of research and engineering for some 50 to 60 years. There is no question that this research has been of great benefit, but it may be getting close to an asymptote in which even vast amounts of further research and development money may reduce accidents only minimally.

For the current proportion of accidents attributed to each of the three broad areas of causation it is difficult to get good figures, but as a rough estimate of the driver contribution to accidents, the Arthur D. Little (1966) report can be quoted. "In the absence of a very striking defect or failure in the roadway, the vehicle, or the driver's own medical condition, the 'cause' of an accident is almost invariably assigned to one or another of a variety of driver errors. Thus, driver error is typically stated to be responsible for from 80 to 90 percent of all accidents" (p. 37). Even where the road or the car might be at fault, the accident

still often could have been humanly preventable or reduced in severity with a skillful driver. Again this percentage reflects the result of the prodigious efforts on the part of the engineers in designing and constructing the roads, the highway environments, and the improvement in the automobile over the years (with the impetus given by Ralph Nader in recent years). One expert opinion on the estimate of vehicle defect accidents is that of Prof. J. Stannard Buher of the Traffic Institute at Northwestern University. His opinion is given in the Arthur D. Little (1966) report. "...it was impossible to identify the share of accidents that are directly attributable to mechanical defects but that he believed it to be probably under five percent of all accidents and perhaps as little as two percent of all accidents" (p. 280). Further evidence is the study "Drivers Who Die" done by the Baylor University, College of Medicine (Highway Safety Literature, HSL #69-10, March 14, 1969, page iii). Over half of these accidents involved single vehicle drivers. In order to determine personality characteristics of these drivers, family members were interviewed by a psychiatrist, then these drivers were compared with a control of 25 matched drivers randomly selected from the Houston area. This group was subjected to the same psychiatric scrutiny as the dead drivers. "The results indicated that 80% of the fatalities were maladjusted in that they were either alcoholics or had personality disorders or both. Only 12% of the control group were so classified" (Highway Safety Literature, March 14, 1969, p. iii). Psychiatric stress, marital, financial, occupational, etc. was prevelant in 80% of the fatality group within 24 hours prior to the

crash. The Baylor researchers conclude, "In general, it appears that the driver's personality pattern, a stressful event, and the resulting intrapsychic reaction coalese to form a condition of impaired driving ability. If alcohol is added, this situation is further compromised leading to the high probability of appearance of an accident" (iv).

Evidence of this type makes one believe that certainly greater concentrations of the research money in highway safety should now be spent in the area of behavioral science research.

Project TALENT (Flanagan, et al., 1964) collected more than 2,000 items of information per student on a sample of about five percent of high school students in the United States in 1960. Follow-up data were collected on each graduating class one year and five years after graduation. A large number of reports of the analyses of these data have been reported (Flanagan, et al., 1965) as well as many studies which have made use of the data for special follow-up and longitudinal research of special groups.

Longitudinal studies of the personalities of drivers involved in automobile accidents are not too frequent (Brown & Berdie, 1960; Asher & Dodson, 1969; Asher & Dodson, 1970). Longitudinal studies, even after the fact, of the personalities of drivers involved in fatal accidents are even rarer (Highway Safety Literature, HSL #69-10, March 14, 1969). Since a fatal automobile accident is hardly an unobtrusive event, it is felt that, if at all possible, the research methodological advice of Webb, Campbell, Schwartz, and Sechrest (1966) in their book Unobtrusive Measures: Nonreactive Research in the Social Sciences should be taken seriously. Finally, Indiana high

school students are quite similar to high school students in the United States in numerous respects (Asher & Dodson, 1970). Thus this study evolved. The Project TALENT sample by 1969 covered a good portion of the age range in which automobile accidents and fatalities are of major importance. The prior unobtrusive measures are available from the Project TALENT Data Bank (Flanagan, et al., 1965). All fatal automobile accident records are available for the State of Indiana in the Accident Records section of the Indiana State Police. What remained was to collect the names of the fatalities, identifying information, and some circumstances of the accident for all those fatalities who were born in years such that they were likely to be in high school in 1960. These could be sent to TALENT for matching in their data bank files, and analysis could be made of the data, perhaps 500 variables, in the data bank for those names which were matched.

It was hoped that important information about those killed could be developed and that these data could be integrated with prior behavioral science theory about persons killed in automobile accidents.

METHODS AND PROCEDURES

Data collection for this study involved two basic steps. First, from the Indiana State Police automobile accident fatality records for all those killed between May 1960 and October 1969, some 10,000 case records in the files were perused. Thus, virtually all those who were likely to have been high school students during the original TALENT study in April, 1960, were included on our recorded list. The State Police files on each accident often included news clippings,

affadavits, police diagrams of the accident, written statements by witnesses and police officers, coroner's reports, and death certificates in addition to the accident reports themselves.

Ordinarily, all information needed could be recorded from the death certificate, if present, since it was quite complete and presumably likely to be the most accurate of the available information. The deceased's full name was recorded; in the case of a married woman both married and maiden name was listed, if available. The maiden name was determined by the last name of the father. The birthdates of the deceased were also recorded. In the few cases where birthdates were not among the information given in police files, the deceased's age at the time of death was recorded. If a discrepancy occurred between the information on the accident report and that on the death certificate (i.e., birthdate, exact spelling of the name, etc.), the death certificate was assumed to be more accurate. In addition to the deceased's full name, birthdate, and sex, his role in the accident; driver, passenger or pedestrian, and whether the accident involved only a single vehicle or not were recorded. The role of the deceased and the number of vehicles involved, was typically recorded by the State Police staff in code in the margin of the death certificate. An example of such a coded entry by State Police is the following:

"ROR, driver, 1 veh."

The above indicated that the deceased was the driver of the auto, that only one vehicle was involved, and that he had ran off the road (ROR).

To summarize, the information gathered included: 1) the deceased's full name, 2) birthdate or age, 3) sex, 4) role in the accident, and 5) whether it was a single or multiple vehicle accident.

Problems arose in deciding how to classify certain accidents. For example, was a collision between an auto and a train a single or multiple vehicle accident? Further, what role did the deceased play in the following cases: driver, passenger, or pedestrian? A boy on a sled which was being pulled by a car was killed when his sled hit a cement bridge abutment. A man who had jumped on the hood of his former wife's moving car, eventually fell off, and was run over. A boy and his friends were on the back of a pickup truck loaded with watermelons they had stolen. The boy, in attempting to splatter one of the melons on the street, fell off the back of the truck and was killed. These cases illustrate some of the classification decisions encountered. In such cases the recorder typically discussed the case with the senior researcher and a conclusion was reached based on the best evidence available. Some decisions were necessarily rather arbitrary. However, in most cases, the State Police had already categorized the driver's role, etc. and a decision by the researchers was unnecessary. Some 2,000 names and attendant information collected from Indiana State Police files, completing the first step of data collection.

For the second phase of the data collection process this list was sent to Project TALENT which attempted to match these names against their files. A total of 44 matches, 31 boys and 13 girls, were ultimately obtained using both the full names of the deceased and their birthdates as criteria. In thirteen cases an exact match was not obtained; for example, spelling of the first name was not exactly the same, though middle and last name and birthdates matched.

TALENT gave further information about these cases such as last home address, high school in which the student took the TALENT battery, etc. In such cases, State Police files were again reviewed and gleaned for all information available which might indicate whether the person in question was in fact a participant in Project TALENT. Five of the thirteen names TALENT returned as "near matches" were ultimately rejected and eight are included in the sample of 44.

Four hundred fifty-five (455) useable variables from the TALENT data bank were received on these 44 young people who had been killed in Indiana traffic accidents since May, 1960, to the date of the end of the data collection in the State Police files, October, 1969. These variables included the results of language aptitude and ability tests, such as memory for words and sentences; and tests of spelling, capitalization, punctuation, and English usage. Scores on complex intellectual aptitude tests - creativity, mechanical reasoning, visualization in two and three dimensions - were also among the TALENT variables requested. The results on a wide variety of information tests (as vocabulary, music, social studies, math, literature, physical and biological science, home economics, law, architecture, theater and ballet, hunting, photography, etc.) were also requested. TALENT's Student Information Blank (SIB) contained over 300 items and provided data on the subjects' backgrounds and plans, including: parental occupation, family income, and general financial situation, plans for college, careers, marriage, and military service, etc. The SIB also included items dealing with the subjects' grades, study habits, social life, and health. A 17-scale Student Interest Inventory and

a 10-scale Student Activities Inventory (yielding scores on 10 "traits" as revealed by self-report on attitudes and behavior) were also among the data received from TALENT. Subjects' intellectual and socioeconomic-educational level were reflected in two composite scores.

Means and standard deviations for the 44 subjects were computed on each of the 455 variables. The sample of fatalities in the data bank was distributed rather equally across the original four high school classes at the time the TALENT data were collected. Thus end of tenth grade norms on the achievement and aptitude data were used with boys' norms weighted two to one to accommodate the preponderance of males in the data bank fatality sample. Only norms for seniors have been developed for the Student Information Blank (SIB) items and these necessarily were used as the comparison for this set of data. While TALENT did afix the type of accident, role of deceased, etc. to the data returned, the fatality sample is obviously too small to make a meaningful cross classification analysis on any of these criteria variables.

Indiana high school seniors have been shown to be quite similar to a U. S. sample of seniors (Asher & Dodson, 1970) while the Indiana climate and roads are perhaps not too dissimilar from some "average" that might be projected for the U.S. (The state is often characterized as "the cross roads of the nation.")

The student's t test with 1,000 degrees of freedom was the statistical method used. Obtained values of 1.962 and greater (absolute value) were declared significant at the five percent level.

RESULTS

On the 54 achievement and aptitude tests, the fatality sample knew more about mathematics (106), farming (113), sports (115), fishing (146), and clerical information (141). (The numbers in parentheses refer to the TALENT Data Bank variable numbers (Flanagan, et al., 1965).)

In the SIB variables (The numbers in parentheses will refer to the SIB items (Flanagan, et al., 1964, pps. 5-6 to 5-35).) it was determined that the fatality group as compared to the normative group, was more active in political clubs (8), less frequently repaired or made electrical equipment (2), had not attended concerts, lectures, plays, etc. as often (30). They started earning money at a younger age (35), got less of their spending money from job, allowance, and family resources (50), read science, political, and history books, etc. less often (59 and 61), but comic books more frequently (63).

In school they had more difficulty expressing themselves in writing (66), making sure they understood the assignments (69), accomplished less in their study time (70), felt that reading more slowly held them back in school (83), pronounced the words to themselves more frequently when they read (84), had trouble remembering what they read (89), and read the materials over and over more without really understanding what they had read (90). The fatality group missed more semesters of school since first grade (95) but had fewer days absent from school during the last school year (96). They took fewer science (98), foreign language (99), social studies (100), English (101), Business or Commercial (102), and algebra, geometry,

or trigonometry courses (104). (It should be recalled that the average person in the fatality group was finishing the 10th grade when the data were collected while the norms were appropriately weighted, male-female, senior class. The fatality group had less opportunity to take these courses.) But both groups had taken an equal number of vocational, shop, or agricultural courses (103). The fatality group had lower grades in history and social studies (109). They discussed college plans with teachers and counselors less (114 and 118). They also discussed their general post high school plans less with their father, mother, counselor, friends their own age, and other adults (122, 123, 125, 128, and 129). (Again remember that post high school was farther in the future for the typical student in this sample when the data were collected than for the norm group.)

Socioeconomically the fatality group's fathers and mothers were more active in labor and trade union activities (141 and 151) and the mothers also were more active in associations at the other end of the scale, the business and professional associations (152). The fathers were less likely to direct or supervise the work of others (132). The non-fatal group had a parent that was more likely to speak some German (159). Also the fatality group had less valuable homes (172), lower estimated income (173), fewer books in the home (176), fewer magazines presenting ladies, fashion, and homemaking (177), picture or news (182), or those such as the Readers Digest or Coronet (188). The fatality group was less likely to have a room of their own, a typewriter, or a study desk (195), and to have brothers or sisters dropping out of high school (201) and not attending a four year

college (205). Their fathers' job status is lower (206), and their mothers' have had less education on the average (219). The fatality group came from larger families (221), and had more older brothers and sisters (222 and 223). The fatalities had poorer health (243), but had been told by a physician that they had an allergy or to take special exercises less often than the controls (269 and 282).

Automobile and driving variables showed that the deceased learned to drive at a younger age (292) but when reporting this datum drove less frequently than the controls (294). (Again recall that at the age of reporting they would be about two years younger than the available normative group.) Having taken Driver Training was not significant (296). From this it actually might be inferred that perhaps the deceased group had taken driver training more frequently than the average student their age since they were about two years younger than the controls. Both groups were the same in the number of times they had recently riden or driven a motorcycle (293). (Remember this was in 1960.) They were equivalent in the percentage that had a car of their own or mostly for their own use (295). Again considering the normative group, this may indicate a greater access to cars at a younger age.

High school and college plans differ markedly between the two groups. The fatality group more often planned to quit high school before graduation (297) and to go to a vocational school (298). They less often planned to go to college full time after high school (301) or to go to college at all (302). They planned to achieve a lower level of formal education attainment (304), were less likely

to take the National Merit Scholarship Test (305), and were less likely to be willing to take out a loan for college expenses (306). The fatality group gave as less likely to be an important reason for attending college, the following: the father wanting them to go (308), greater earning power later in life (310), learning more about a career (311), enjoying learning (313), or their teachers thinking that they should go (314). They were more likely to feel that a college education is not necessary for community leadership or to earn a good salary (336), their friends were planning less education (338), they were more likely to plan on a military career (340), their occupational plans were less definite (348), and were younger when their present occupational choice occurred (349). (Again recall that with variables related to age and maturity, the fatality group was about two years younger than the normative comparison group.)

Uninteresting work is less likely to be a reason for the fatality group to have quit a job (357). They were planning on having fewer children (362). They were planning to save less during the first five years after beginning to earn their own living (372). They would be willing to borrow less to go to college even if there were no other way to go (376), planned to need less money in college for tuition, books, and fees (among those planning to go) (382), would need more loan funds (384), planned to receive a smaller percentage of their college expenses coming from their parents (387), and the distance of the nearest college for which they were eligible was greater for the fatality group (392).

The Student Activity Inventory from the Data Bank (a personality test) has ten variables for which eleventh grade norms were available. On five of these variables, the deceased group was less socially sensitive (602), less calm (605), less tidy (606), less cultured (607), and less mature in personality (610).

Finally in the occupational interest inventory from the Data Bank, the fatality group is less interested in physical science, engineering, and math (701); biological science and medicine (702); and are more interested in laboring type jobs (717).

The numbers of the Data Bank variables, for the record, that were tested and no significant differences found were (inclusive): 102 to 105, 107 to 112, 114, 131 to 140, 142 to 145, 147 to 151, 162, 172, 211, 212, 220, 230, 240, 250, 260, 270, 281, 282, 290, 311, 312, 333, 340, and 500. The SIB question numbers (Flanagan, et al., 1964, pps. 506 to 5-35), which are all available in the Data Bank (although not quite all were tested here). Those which were not significantly different were (inclusive): 1 to 7, 9 to 19, 21 to 29, 31 to 34, 36 to 48, 51 and 52, 54 to 58, 60, 62, 64, 65, 68, 71 to 82, 85 to 88, 92 to 94, 97, 103, 105 to 108, 110 to 113, 115 to 117, 119 to 121, 124, 126 and 127, 131, 133, 135 and 136, 138 to 140, 142 to 150, 153 to 158, 160 to 171, 174 and 175, 178 to 181, 183 to 187, 189 to 194, 196 to 200, 202 to 204, 208, 215 and 216, 218, 225 to 233, 238 to 242, 244 to 268, 270 to 281, 283 to 291, 293, 295, 296, 299, 300, 303, 307, 309, 312, 315 to 335, 337, 339, 341 to 347, 350 to 356, 358 to 361, 363 to 371, 373 to 375, 377 to 381, 383, 385 and 386, 388 to 391, 393 and 394, 601, 603 and 604, 608 and 609, and 703 to 716.

In all 95 variables were found to be significant at the t test level selected. This is considerably greater than the some 23 expected from the 455 variables tested (if independence is assumed).

DISCUSSION

From the description of the differences between the two groups it can be seen that socioeconomic, psychological, and educational level variables appear to be major factors differentiating the automobile accident fatality group from those who lived. The fatality group appears to be lower on many variables of educational achievement and aspirations. For instance, they had more trouble reading, writing, and understanding assignments and what they read. What they did know tended to be related to outdoor or rural activities. They felt they needed less education. Their parents tended to be at the lower end of the socioeconomic scale. Their homes were of less value as was their income, and they had fewer of the advantages of books, magazines, and study equipment. Their mothers had less education, and perhaps they saw a doctor less frequently. The deceased group had personalities that seemed less mature. Perhaps of most relevance to this study were driving habits. Those who died in automobile accidents learned to drive younger. They may have driven less frequently, taken driver training more often, and had access to a car for their own use more frequently.

Perhaps the most important outcome of this study is to produce data for the design of a study in which the variables related to automobile accident deaths could be pin pointed with greater accuracy.

A nationwide study should be done. It is not exceedingly

difficult to identify those who died during the last ten years who could have been in high school in 1960. Some 80,000 to 100,000 names would comprise this list. They would be in the prime age group for contributing to automobile fatalities. Of these it is now known that probably 1,600 to 2,000 of those killed could be identified with reasonable accuracy in the TALENT data bank files and this unobtrusive data made available for analysis. These data could be analyzed by male and female, age at death, type of accident, geographical region, role of the deceased in the accident, etc. The class year during which they took the TALENT battery in high school can be determined. (Norms could readily be developed by class for all the variables.)

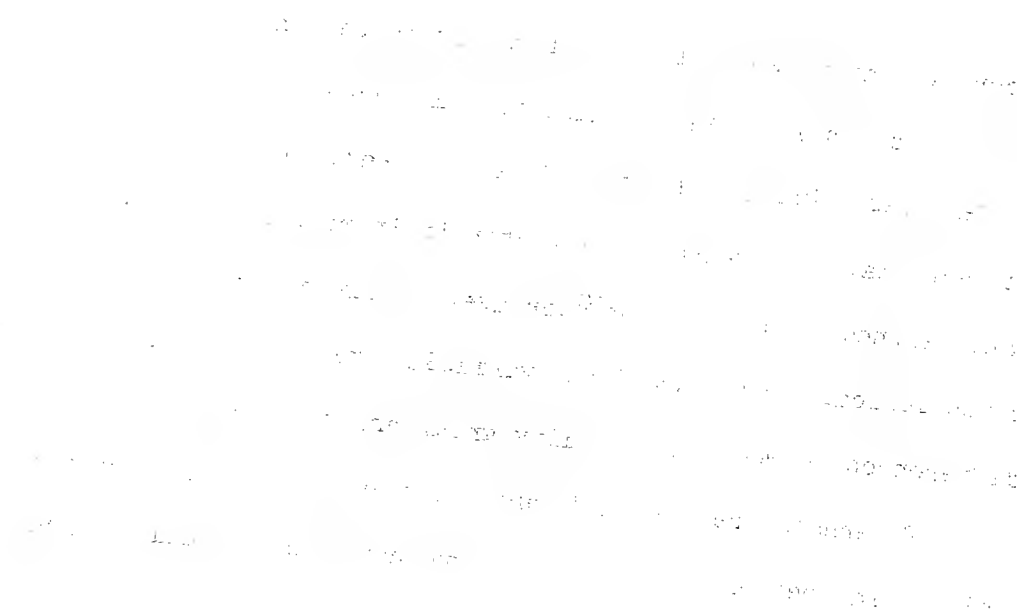
It can probably be said conclusively that these data and analyses will definitely not resolve the automobile accident death problem in the United States. However, it does seem reasonably logical to suggest that this is a very important age group, that human variables in the emotional, social, economic, and educational areas, etc., now do play the major role in fatal accidents and that an analysis of the data bank variables for this large national sample could be of considerable value.

CONCLUSIONS

From the literature it is apparent that the prime contributor of automobile accidents is human factors. Teenagers and young adults are greatly over represented in accident statistics with respect to their proportion of all drivers. This longitudinal study of automobile accident fatalities in this age group determined with some

accuracy that those killed are lower in educational and socioeconomic levels than their cohorts. Also they may have distinct psychological differences. Driver education is of no predictive importance and, in fact, may be somewhat of a factor in increasing the death rate. They learned to drive at younger ages. Four hundred fifty-five social, psychological, and educational variables were tested and 95 showed differences between the fatality group and the norms.

Of perhaps greater importance is the collection of data from which a far better study of this type could and should be done.



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